

Management of granite rocks

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Abstract

This paper discusses the possible goals of management of granite rocks in terms of the values associated with them and the sensitivity of different values to use. It is suggested that they may be viewed as rock islands. Many of the contrasting values are shared between the individual rocks and the surrounds *e.g.* picnic sites, but such contrasting habitats are not equally tolerant of disturbance. Problems associated with management are diverse and the task of managing rocks cannot be reduced to simple recipes. This paper sets out the difficult management problems which have to be resolved because of conflicts arising from the very disparate values attributed to rocks by different groups, and concludes that adequate management will depend on public cooperation based on an informed awareness of the diverse values attributed to rocks.

Introduction

Granite Rocks as a title would not pass with image makers or advertising copy writers who are skilled at attracting attention. As a term widely used to identify igneous (granite) or metamorphic (gneissic) rocks, to the public, the term evokes no special image except of mere rocks, usually with a rounded form which often stands above the surrounding countryside. Thus while the term is perfectly adequate as a descriptor it does not inspire any belief among the public that granite rocks have important attributes, especially any that would warrant efforts for their conservation or management. Management implies striving for a goal, to achieve something worthwhile, such as conservation. Such a suggestion leads to expressions of disbelief and the general response is to ask what is special or worthwhile about granite rocks? The pervasiveness of this attitude is manifest in the frequent laments about the paucity of information on the terrestrial animals of granite rocks. Clearly a term with a more evocative connotation would be helpful in stimulating interest and research. Other widely used terms are available, such as monadnock or inselberg. These have quite specific technical meanings as landforms but for conservation purposes where development of a conservation ethic and public support is required for success, a less forbidding term which will indicate to the public, the potential of rocks as sites for conservation, is needed. Island hills (Jutson 1934:350), the anglicised version of inselberg, suggests that the rocks, rising as they do from the surrounding countryside, may be viewed as the analogue of islands in the sea. Looked at in this way they may be seen as having potential as sites of biological evolution or be places where relicts of former plant and animal distributions may be found. Should this be so, then granite rocks have a significance in terms of the State's conservation strategy, one of its goals being to maintain biodiversity, as living resource conservation (Anon 1987). But, there are others in the community who are aware of other values possessed by

these rocky island hills. Because of these different values there is the potential for conflicts which lead to the need for a method of resolving them. A standard approach to such matters is to establish management goals and plans to achieve them. Whether such an approach is feasible for such isolated entities is the main test of this paper.

Management

Only a small proportion of the large number of granite rocks available are designated as, or are within, conservation reserves or State Forests. The Porongorups are a very large system of rocks and tors designated as National Park and therefore have a specific management plan. However, when included within larger reservations, granite outcrops are usually too small to be mapped at the scale commonly employed when devising management plans. Similarly, those granite outcrops within State Forests are not usually large; Christensen (1992:99) when writing of the karri forest makes the point under the heading of granitic monadnocks that "Many of the more prominent occur within parks and reserves; most of the remainder are in State Forests where they are secure because of their inaccessibility and absence of commercial value". Forest working plans may exclude granite areas from hazard reduction burns. Those occurring in the developed areas of the State are subject to a variety of uses and tenures; some are designated as water supply, others vested in local authorities, or are on private land or pastoral leases. They may be adjacent to or distant from settlement. A large number are unvested on vacant crown land. There is thus no hope of implementing a management regime run by a local or resident staff of rangers controlled by a central authority such as the Department of Conservation and Land Management. Moreover they are accessible. A more diffuse plan based on education, understanding of the problems and opportunities offered and involving co-operation between all those involved would seem to be a more sensible goal.

Ideally before management for conservation can be implemented it is necessary to know what is there, its rareness, abundance, whether it is replicated elsewhere

and its significance. Because flowering plants are easier to observe than animals their distribution and abundance is better known but in particular the question "Why and to whom are the features significant?" needs to be addressed because this will determine the nature of the conflicts which might arise when developing management plans. Also to be considered are the implications of this knowledge for historical interpretation as well as for management. Ultimately, the foregoing information will allow a statement to be made of what is to be managed, why it is to be managed *e.g.* significance in terms of uniqueness of landforms, rarity of biotic elements or their manifestation in an evolutionary or distributional pattern. Finally, it will be possible to assess how these attributes might be managed so that the elements of value for conservation are retained. Progress in achieving the above is possible once the basis of individual preference and perception of values can be established. But, granite rocks are usually so small and accessible that any management based on a system of zoning is impracticable.

Perceived Values

Values are established by people familiar with, and conscious of, the uses to which rock sites may be put. These include local residents, visitors, tourists and tour operators, botanists and zoologists, geologists (land forms, local water supply, quarry sites for road material and aggregate). In a general sense the usages can be classified as aesthetic and recreational (picnic sites, vantage points for viewing the countryside), cultural, (natural history *e.g.* displays of wildflowers in spring), heritage (historical sites, both Aboriginal and European) and utilitarian (quarry sites, water supply, slabs for facing culverts and channels for diverting run-off water into holding tanks, linings for wells in the apron soils adjacent to the rocks) and conservation. Additionally retention of aesthetic, recreational and conservation values is dependent on the maintenance of surrounding bushland from which lateritic gravel may be removed for road building material. Clearly these values are not all compatible.

Consequences of Use

Visitors, tourists and picnickers

This category of users do not see themselves as having much impact on the attractions of granite rocks. Nevertheless their compaction of soil at picnic sites at the rock base, initiation of erosion, trampling of lichens and displacement of slabs from rock surfaces lead to slow and irreversible degradation of the site. When such activities are accompanied by the use off-road vehicles which have an immense capacity to destroy the lichens of the rock surface, furrow the small rock bound meadows and disturb and pollute rock pools, the consequences are nothing short of catastrophic. Moreover, pristine rock pools frequently had slabs or rocks on their floor; when ponds dried these became sites beneath which frogs could over-summer (*Crinia*, *Pseudophryne*) or lay eggs before the pools filled in winter (*Pseudophryne*). Unfortunately, it seems to be common practice to gather rocks and slabs into piles or to throw them down rock slopes; either

activity destroys essential frog and lizard habitat and is the antithesis of good conservation practice. However, for those who enjoy the exhilaration of climbing to the top of the hill and viewing the country to the distant horizon these changes mean nothing.

Cultural

Wildflower displays in spring are the principal attraction. However, people are frequently attracted to mass displays of ephemerals such as everlastings (*Rhodanthe* and other composites) though some are especially attracted to orchids and other less conspicuous flowers. These flowering species vary in the intensity and size of their display depending on the season so most visitors understand the causes of the observed variability. Such is not the case with shrubs such as *Kunzea*, *Thryptomene* and other Myrtaceae which show a decline in vigour and failure to recruit. These changes are usually not remarked upon until the population approaches extinction. Even then awareness of the seriousness of the situation is only possible if the folk memory of the local population can recall what it was like in earlier times. Less conspicuous plants *e.g.* *Isoetes* or *Phylloglossum*, less spectacular flowering plants and invertebrates can disappear, without their loss being noticed, as a result of mere visitor pressure arising from activities mentioned in the previous paragraph.

Heritage

Few are aware of the significance of rocks as Aboriginal Heritage. Sites are known with stone arrangements and stenciled hands but the myths and legends relating to rocks and gnamma holes are little known. Information regarding the significance and distribution of localities needs to be assembled before appropriate management is possible. European heritage essentially begins with the early explorers who used, and were often dependent on, Aboriginal watering points. These water holes were essential for the maintenance of populations of birds and mammals. With the discovery of the Coolgardie and later the Kalgoorlie goldfields, heavily used trails were developed to them from York and Albany. These trails are characterised by the rocks, gnamma holes and watering points along the route. Later, many of these were used by early settlers and carefully constructed stone lined circular wells attest to their importance to both travellers and settlers. There is thus much of heritage value associated with rocks. Unfortunately it is easily destroyed and readily lost.

Utilitarian

Depending on mineral composition and rock fabric, granite rocks may be suitable as sites for quarries providing a source of aggregate for concrete making or road building material. Rock slabs resulting from exfoliation of rock surfaces were often cemented edge-on to form shallow spiral channels around rocks so that water normally shed to the apron soils was diverted into large holding tanks and thus provided a more dependable water supply. Such constructions destroyed much cover and many shelter sites for lizards which formerly frequented them. Furthermore, the diversion of water deprived the vegetation growing on the apron and surrounding soils of soil recharge with a consequent increase in aridity of these habitats.

Under natural conditions, water shed from rock surfaces contributed to ground water recharge, and much of this was subsequently transpired by the natural vegetation. However, in settled areas where natural vegetation is removed or reduced to mere fragments around rocks, transpiration is reduced and run-off from rock surface contributes significantly to ground water recharge and hence to rising saline water tables beneath soils of nature reserves and farms lower on the landscape. It is clearly an advantage to maintain native vegetation around granite rocks.

Conservation

The broad goals of conservation are to maintain biodiversity. This clearly has less tangible value than the matters discussed above. Maintenance of biodiversity can be seen as public good, the fulfilment of an ethical and moral obligation to cherish and leave an environment for the next generations that is as rich and enjoyable as the one experienced by the current generation. The values and usages enumerated in the preceding paragraphs are often incompatible with the goals of conservation. Moreover, it is often said that since conservation has no value in the market place, then it is not justifiable to use conservation value as an argument against useful developments. It is true that what nature provides as a free service is never appreciated in monetary terms until its loss has to be halted or the former service restored. In these terms one can look at the loss of picnic amenities, tourist dollars, or correction of rising saline ground waters as an approximation of the true monetary value of the so-called free services of nature. Management should address all of these issues while being aware that not only humans but feral animals such as cats, foxes and rabbits make a significant contribution to the loss of conservation values and biodiversity.

Discussion

Viewing granite rocks as islands suggests that the emergent rocks of the Western Australian plateau can be seen as an extensive archipelago stretching from the high rainfall South west to the arid interior. This interpretation offers special opportunities for management. In part this is because of the range of

climates spanned by their distribution, but recent geological history, when arid areas and their biotas expanded and contracted (Hopper 1979) has meant that many rocks in the region of fluctuating environment now have unusual combinations of biotic elements. Such rocks are of special significance as a record of the way the biota responded to past climatic changes. Additionally the array of rock islands offers an opportunity to establish the minimum viable population size of many taxa under an array of climatic and other conditions. This is an important practical and theoretical conservation problem so an opportunity to obtain an answer relevant to local conditions should be a major consideration for management.

The above discussion suggests that management will only be possible within a framework of social values, usage, cultural, geological and biogeographic history and conservation values. The complexity of the problems and conflicts along with possible management approaches are presented in Table 1. To the authoritarian mind, the complex set of interactions revealed in Table 1 can only be solved by having an enforceable set of rules accompanied by suitably punitive penalties. But such an approach implies a management presence which will be expensive. Equally it will tend to ignore special local circumstances and interests. Such an outcome leaves a disgruntled group who, more often than not, ignore the regulations. A more community centred programme based on discussions leading to the development of an understanding of the views and values held by others might be more rewarding.

Conclusion

Management of granite rocks will be complex and difficult. It will be impossible without a sympathetic and understanding public. Thus, before adequate management can develop, the public needs to become aware and appreciative of the values inherent in granite rocks. It is upon such an understanding that a satisfactory and enduring management can be developed based on a view of rocks as repositories of valuable information relating to Australia's biota as well as being venues for aesthetic, cultural, recreational and occasionally utilitarian values.

Table 1

Values, threats, conflicts and management of granite rocks

	Conservation	Recreation	Heritage	Utility
Values	All biota	Climbing, viewing, picnicking.	Aboriginal, Historical.	Watersupply aggregate, road material
Threats	Use, trampling, rock removal, picnic fires.	Overuse of picnic sites, soil erosion	Lack of awareness, failure to recognise.	Sites have other values
Conflicts	Recreational use is harmful	Use destroys other values	Other uses.	With all other values
Management	Education to appreciate values.	A caring responsible attitude.	Education, awareness	Regard for other values

References

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